

Colorado Governor's Energy Office Weatherization Description of Services

GENERAL POLICY

- The GEOWX Field Standards shall apply to all local administering agencies and their sub-contractors providing Weatherization services through the Governor's Energy Office Weatherization (GEOWX) program.
- These policies and procedures are not intended to abridge safety, health, environmental, or local codes or other ordinances. Such requirements, if more stringent than these, shall apply; if these Standards are more stringent, then they shall apply.
- The health and safety of the clients, agency staff, agency subcontractors and the integrity of the building structure must not be compromised by any work completed with GEOWX funds.
- The agency GEOWX program manager/coordinator has overall responsibility for proper implementation of the procedures and for the quality control of all repair and energy conservation work.
- All installed weatherization materials must meet the materials standards taken from Appendix A of 10CFR440, must be of good quality, and must be installed in a safe, cost effective manner.
- Work not meeting quality expectations may be subject to findings, re-inspections, go-backs, and disallowed costs.

AGENCY OBLIGATIONS

File Documentation

Each client file must contain:

- An indication of the generic priority list that was used for the unit.
- All required combustion-appliance documentation.
- Documentation of the initial field audit, including the auditor's name and the date of the initial audit.
- Results of a pre- and post-weatherization blower door test.
- An inspection form signed by an agency staff person.
- Accurate records of all materials installed.
- Documentation of waivers.
- Documentation of notification to owners and clients
- A Refrigerator Replacement form.

Owner Participation

Repair costs must either meet the cost-effective criteria, be allowed under Health and Safety, or the property owner must pay for the repair.

State Agency Visits

Agency visits include quality assurance inspections and also training and technical assistance (T&TA). A visit report may include inspection and/or T&TA information.

- GEOWX State staff regularly inspects units completed by sub-grantees. All installed materials must be cost effective, safe, of good quality and appearance. Discoveries of violations of policies and procedures are called findings. Major findings are serious and/or repeated. Minor findings are minor and/or not repeated.
- Work not meeting quality expectations may be subject to findings, required go-backs and/or disallowed costs.
- All sub-contractor work must pass an inspection by qualified local agency staff, prior to payment.
- Sub-contractor work not meeting quality expectations that requires correction, will be done at the sub-contractor's expense.

Findings

Any non-compliance with an GEOWX policies or procedures constitutes a finding. Major findings are severe or repeated. Minor findings are less severe or not repeated. Examples of major findings include the following:

- The health and safety of clients, agency staff, or agency subcontractors, or the integrity of the building structure is threatened by work completed with GEOWX funds.
- A weatherization-related health or safety problem is created by, exacerbated by, or not corrected by the delivery of GEOWX services.
- The omission, without appropriate authorization, of a required cost-effective measure, a necessary repair, or a required health and safety repair.
- Poor-quality work, materials, or equipment that results in significantly degraded performance or appearance of measures or repairs.
- Major expenditure of funds on measures that are not included on the appropriate generic priority list, or are not required in the GEOWX Field Standards.
- Expenditure for materials not listed in Appendix A of 10CFR440.
- Any action or lack of action that may result in a liability that threatens GEOWX grant funds.

Examples of minor findings include the following:

- A single occurrence of poor-quality of work, materials, or equipment that results in minor degradation of performance or appearance of measures or repairs.
- Work site clean up that does not meet the satisfaction of the client or the State Inspector.
- Required energy conservation measures that are not installed, but would not contribute a large energy savings.
- Required health and safety measures that are not addressed, but are not threatening the health or safety of the client.

T&TA Visits

T&TA visits by GEO Staff are intended for training purposes. No findings will be cited during T&TA visits. Recommendations for agency actions may be issued to agencies based on circumstances observed and

guidance will be offered on the visit report provided to the agency.

GEOWX Field Standards Waivers

Agency waivers exempt the agency from performing a required measure:

- If it is technically not possible to install the measures.
- If conditions exist, and cannot be overcome, that would make the installation of the measure unsafe.
- The installation of the measure would threaten the health or safety of either the client or the worker.

State waivers permit policy exceptions:

- State waivers will be granted on a case-by case basis in writing.
- Work may proceed only after assignment of a State waiver number by the GEOWX State staff.
- Fuel conversions and pilot projects require State waivers.
- Agencies who are unable to provide services according to the GEOWX Field Standards because of Local Codes must supply written documentation to the Energy Services staff and request a State Waiver.

Energy Audits and Final Inspections

- Agencies must use properly trained and qualified auditors and inspectors.
- An Energy Audit is required on every home prior to performing any work other than emergency response related work.
- The final inspector must ensure that all measures required by the GEOWX Field Standards have been installed, and that the work quality meets expectations. An exception is allowed for low need units that are completed during the energy audit.
- Each completed unit must be inspected and the inspection must be documented in the unit file. No dwelling unit may be reported as completed until all weatherization materials (other than refrigerators) have been installed and the agency has performed a final inspection(s) including any mechanical or subcontractor work performed.
- All installed weatherization materials must meet the materials standards taken from Appendix A of 10CFR440, must be of good quality, and must be installed in a safe and effective manner.

Energy Audit:

The primary objectives of the energy audit is to survey the home for the potential to install energy related measures, to check for safety hazards and building durability issues, to converse with the client, to document the audit, and to write a work order detailing work to be done and situations that need to be addressed. Understanding energy use is a key to performing an exemplary audit.

The energy audit must include:

- An assessment of health and safety hazards; assignment of work based on an approved priority list; a blower door test; a duct assessment; an insulation assessment.
- The appropriate State-approved generic priority list must be used to determine which measures are cost-effective to install. The client file must contain documentation of which generic priority list was used.
- A site-specific computer energy audit may be used if unusual circumstances exist and the result of running the audit would help to clarify which measures should be installed. The client file must

- have an accurate priority list generated by this State-approved computer energy audit.
- Multi-family buildings Type 3 & Type 4 (central heating) require agencies to consult with the GEOWX State staff in the development of an appropriate priority list.
- The field audit must include at least the following activities:
 - Information collection: Assess and record the existing conditions of the dwelling and its mechanical systems.
 - Dwelling evaluation: Evaluate the existing conditions for energy conservation opportunities and energy related health/ safety problems.

Dwelling strategy: Develop a strategy for improved energy efficiency and for correcting energy-related health and safety problems.

Combustion Safety Testing

- Fuel leak detection.
- Spillage and CO testing
- Cracked heat exchanger inspection
- Combustion appliance operation
- Duct leakage and performance test

Air Leakage

- A single-point blower door test
- Detection of indoor air quality issues.
- Indoor air quality pollutant source identification.
- Duct leakage assessment

Combustion Efficiency Determination

- Determination of appliance AFUE or,
- Measure the steady-state efficiency of a vented combustion appliance.

Thermal Performance

- Determine the location of the thermal boundary
- Determine and document the R value of all areas of the thermal boundary

Electrical Safety Testing

- If insulation is to be installed, electrical wiring fuse protection, wire type and size, and splicing must be inspected.
- Wiring in enclosed cavities must have the voltage drop measured.

Electric Base-Load Testing

- Existing refrigerators must be metered or its electrical usage must be located in an approved database and the annual energy consumption must be estimated.
- Hot water temperature at faucet closest to the water heater must be measured. The temperature and the setting must be discussed with the client.

Exhaust Fan Flow

- Exhaust fans must be checked for operation.
- Agencies must inspect for mold during the initial energy audit.
- Situations that are “beyond the scope” of weatherization generally include situations that would

put workers health at risk, may cause undue liability to the agency, or require expenditures that are beyond the cost-effective guidelines.

Client Education

Clients must be provided with information regarding:

- Explaining the weatherization process.
- Suggestions for reducing heating costs
- Suggestions for saving hot-water and laundry energy
- Suggestions for staying cool during hot weather
- Other energy-saving suggestions

Final Inspections:

Building Shell

- Review the original energy audit form.
- Ensure all required procedures were performed.
- Verify the accuracy of the audit, including measures that may have been omitted.
- Inspect all work to ensure that standards of workmanship and materials are met. Make sure that the job site is cleaned up.
- Perform final blower door readings if appropriate.
- Call for corrective actions where initial work does not meet standards.

Combustion Appliances

- Verify that all work was completed as required.
- Re-test appliances to confirm that they currently operate in a safe/dependable manner.
- Call for corrective actions where initial work does not meet standards.

File Review and Completion

- Review all required forms for accuracy and completion.
- Document required go-backs or follow-up work.
- Sign and date an inspection form assuring that you have verified that all GEOWX requirements have been met.
- A job is complete only after all work—crew or contractor—has been completed and has passed inspection.

Installation of Measures

Weatherization measures serve three purposes:

- 1 Conserve energy and reduce household energy bills.
- 2 Protect household members from energy-related hazards.
- 3 Protect homes from damage caused by fire or moisture.

Attic insulation

- Insulation must be installed in such a manner that ensures complete coverage at the thermal boundary and consistent R-value, except where physical constraints may exist.
- All attic non-rated heat sources shall be blocked.

Sidewall insulation

- Cellulose sidewall insulation must be installed to at least 3.25 pounds per cubic foot density, and in such a manner that does not allow settling of the material to occur. Proper use of a fill tube is necessary to consistently achieve this density.
- Sidewalls must not have voids totaling more than 5% of the net wall area.
- Agencies must obtain a warranty, of at least one-year, against voids of more than 5% (as described above) from subcontractors.

Sub-floor Insulation

- Crawlspace moisture problems must be addressed by source control. This usually involves installing a ground moisture barrier or correcting drainage problems.
- Foundation walls must be insulated so that no portion above-grade wall is left uninsulated.
- Sub-floor insulation should provide as continuous a thermal boundary as possible.
- Sub-floor insulation must be fastened securely in place.

Air leakage and convection

- Air leaks and convective bypasses must be assessed and corrected.
- The cost-effectiveness of the air leakage reduction must be determined and documented in the client file.
- Technicians should not perform intentional air sealing when a building is below 2000CFM @ 50Pa.

Windows and Doors

- Windows, on an individual basis, may be repaired, replaced, or a storm installed over them, if they are damaged and leaking large amounts of air.
- Storm windows must be installed when cost-effective and feasible.
- Individual doors may be repaired or replaced provided it is cost-effective to do so, or they are severely damaged and beyond repair.

Ducts

- Ducts must be cleaned to remove objects that impede airflow.
- Ductwork outside the thermal boundary must be reconnected, sealed, and if uninsulated, they must be insulated to at least an R-11.
- Large duct leaks to unintentionally heated areas inside the thermal boundary must also be sealed.
- Return air ducts in the vicinity of combustion appliances, except gravity systems, must be sealed to eliminate the potential for back drafting.

Appliances:

Combustion Appliance General Requirements

- Combustion appliances must operate in a safe and reasonably efficient manner.
- GEOWX combustion appliance procedures must be followed.
- There must be no spillage into the living space of the home at five minutes into the combustion cycle.
- Carbon monoxide in the undiluted flue gas must not exceed 250 ppm.
- There must be no fuel leaks.

- Flex connectors that are damaged or older than 1973 must be replaced.
- Low-efficiency furnaces must be assessed for replacement with high efficiency furnaces as an GEOWX measure.
- Each client file must include documentation of all work done to the water heating and space heating combustion appliances.
- Clients may not be left without heat during the heating season. Agencies must respond to heating emergencies as quickly as possible.
- Combustion Appliance Procedures include:
 - Initial Assessment
 - Spillage and CO tests
 - Gas Leak Detection
 - Heat Exchanger Inspection
 - Advanced procedures may only be performed by qualified furnace technicians.

Heating System Replacement for Health or Safety Reasons

- Subcontractors must comply with the same standards as agencies when replacing heating systems.
- Heating systems in client-owned homes must be replaced if the heat exchanger is cracked.
- Heating systems may be replaced as a Health and Safety measure under the following conditions:
- Open-combustion mobile home furnaces with safety problems.
- Repair costs in excess of 40% of replacement cost.
- Cracked heated exchanger.
 - Building owners must contribute at least 50% of replacement costs, unless the owner qualifies for the GEOWX Program.
 - Heating systems in client-owned homes must be replaced if the heat exchanger is cracked. No cost sharing participation is required.
- When the furnace has chimney problems, agencies must consider installing a 90%+ AFUE condensing furnace.

Furnace Replacement for Energy Efficiency

- Priority should be given to clients with high space heating costs. Home owners and renters should be treated equally if the rental properties have adequate third party contributions.
- All furnaces manufactured before 1982 must be considered for replacement. A furnace of any age, with an AFUE (Annual Fuel Utilization Efficiency) that is 70% or less, may be considered for replacement. The efficiency of the existing furnace must be determined and documented in the client file.
- Mobile home furnaces manufactured prior to 1982 may be considered for replacement. Mobile home furnaces manufactured after 1988 may not be replaced.
- Any LPG fired furnace with a standing pilot and draft hood may be replaced with a sealed combustion furnace with electronically controlled ignition.

- The owner of a rental property must be asked to contribute to the cost of purchasing the new furnace. Owner contributions will be used to directly offset the cost of the furnace installation.
- Agencies must consider installing furnaces with an AFUE of 90% or greater, before considering the installation of a furnace with a lower efficiency rating.
- Agencies must provide at least a one year warranty on the new furnace.
- New furnaces for site- built homes must carry a five year warranty on parts and a fifteen year warranty on the heat exchanger.
- New furnaces for mobile homes must carry at least a one year warranty on parts and a ten year warranty on the heat exchanger.
- Unvented gas space heating appliances may not be installed.
- The furnace repair history for new furnace installations must be considered when purchasing furnaces and preference must be given toward purchasing furnaces with the lowest repair history rate. Furnaces with repair rate histories that are greater than 18% may not be purchased. See: <http://www.consumerreports.org/cro/home-garden/heating-cooling-air/furnaces-repair-history-205/overview/index.htm> or other reputable third party report on furnace repair histories.

Refrigerator Assessment and Replacement

General Requirements

- Refrigerators that are more than five years old must be evaluated for replacement. Refrigerators that are five years old or less do not have to be considered for replacement.
- Only operating refrigerators and refrigerator -freezers may be replaced.
- Individual refrigerators may only be replaced with a new refrigerator that meets the cost-effective criteria (SIR) of 1.
- Eligible refrigerators that are not metered have their energy consumption rate verified by an approved database.
- All eligible refrigerators whose manufacture information cannot be determined must be metered.
- Eligible refrigerators are those functioning appliances that meet the owner agree to replace, meet the SIR criteria for replacement, and can reasonably be accessed for removal and replacement.
- The owner of eligible refrigerators must sign the GEOWX Refrigerator Replacement agreement, and must comply with the terms of that agreement, including relinquishing ownership of the old appliance at the time of delivery of the new appliance. Landlords who own eligible refrigerators must be asked to contribute to the cost of replacement.
- Agencies must meter at least 10% of the refrigerators that are replaced. The minimum time duration of the metering is a two hour period, uninterrupted by a defrost cycle. If the defrost

timer cannot be advanced, a meter capable of detecting the defroster run time must be used to meter for a minimum of 3 hours.

- New refrigerators must be plugged into grounded outlets. If the outlet is not grounded, check to see if the outlet box is grounded. If it is, it will be possible to ground the outlet to the box. A three prong adapter with a ground wire that is grounded to the box may also be used.

Domestic Hot Water

- Domestic water pipes likely to freeze must be insulated.
- Electric water heaters outside the living space must be insulated if the total existing tank insulation is less than R-11.
- Gas water heaters outside the living space of the structure must be insulated if the existing tank insulation is less than R-7.
- Domestic hot water temperature must be measured.
- Rental properties require a negotiated participation in the cost of the water heater conversion by the property owner.

Health and Safety

- Weatherization services must be provided in a manner that minimizes risks to workers, clients, and clients' homes.
- Weatherization services may not begin until health and safety problems, beyond the scope of the GEOWX program, are removed.
- Agencies must have in place and enforce an OSHA compliant worker safety plan.

Client Health and Safety

- It is the agency's responsibility to comply with applicable Federal and State laws.
- Building owners and clients must be notified of any health or safety problems that require weatherization work to be terminated.
- Repair of moisture problems, which could degrade or diminish the effectiveness of weatherization measures, is required.
- Combustion appliances must be tested for carbon monoxide, spillage, and gas leaks. Problems found during testing must be corrected in an efficient and timely manner.
- Client files must include documentation of all safety tests and work done on combustion appliances.
- Agencies and their contractors are required to follow procedures to protect their clients from hazardous materials and dust associated with weatherization work.

Safe Materials Installation

- Product bid solicitations should include language describing the manner in which the product will be used, and should include language that states that products offered in the bid response must be appropriate for that use.
- Agency field staff must install such products in accordance with the manufacturer's directions.
- Agencies are reminded that they must determine if the client has pre-existing health problems that could be affected by weatherization work or materials, and must

take appropriate actions to protect the client's health.

- Agencies must provide specific instruction to their field crews directing them to take precautions or waive measures, if the client's health could be adversely affected.

Staff Health and Safety

- It is the agency's responsibility to initiate and maintain programs comply with Occupational Health and Safety Act Regulations (29 CFR 1910 & 1926), and any other applicable Federal and State laws enacted to protect worker safety.
- Weatherization services must be provided in a manner that minimizes risk to workers.
- Sub-contractors are required to follow procedures set forth in the GEOWX Field Standards, and to meet DOE Health and Safety requirements.

Allowable Health and safety Repairs

Health and safety related repairs within the scope of GEOWX includes the following:

- Furnace replacement.
- Carbon monoxide mitigation.
- Heat exchanger replacement.
- Burner replacement.
- Installation of combustion-air duct.
- Materials to repair gas/propane leaks.
- Propane sniffer for below grade use.
- Chimney cleaning/lining.
- Water heater tank replacements (not fuel conversions).
- Carbon monoxide and smoke detectors.
- Installation of mechanical ventilation systems
- Ground moisture barrier
- Clothes dryer venting
- Plumbing repairs
- Sump pump repair
- Bulk water drainage materials

Allowable Necessary Repairs

Necessary repairs completed with GEOWX funds include the following:

- Electrical repairs
- Structural repairs

Lead-safe weatherization

- An EPA compliant Certified Renovator must be on-site, and all EPA and DOE requirements for lead base paint safe work practices must be followed on homes built before 1978 where painted surfaces will be disturbed, unless they are certified lead free.
- Agencies must provide Lead Safe Work Practices training to all employees working in client homes.

